Facility Planning

Where Education Meets Architecture

4th Annual *Indoor Air Quality Tools for Schools* National Symposium
Washington, DC

Raymond C. Bordwell, AIA

Principal, Director, Educational Facilities Consulting Group

P E R K I N S

& W I L L

Architecture, Interiors, Planning

Atlanta

Boston

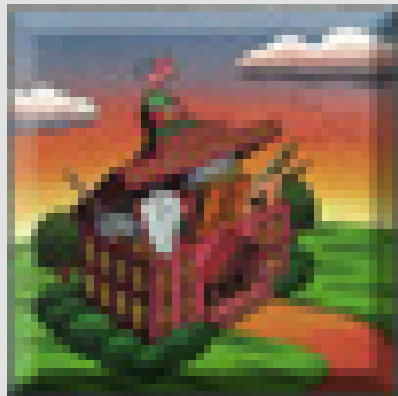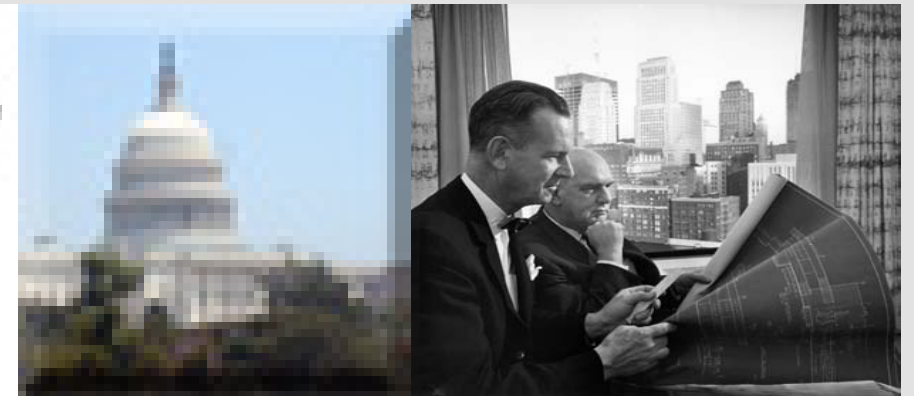Charlotte

Chicago

Dallas

Los Angeles

Miami

Minneapolis

New York

Shanghai

4th National Schools Symposium
October 26-28, 2003

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Agenda

Where Education Meets Architecture

Challenge…

- Introduction

- Environmental Issues

- Enclosing the Learning Environment

- Looking to the Future

- Harnessing Change

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Main Entry: **class·room**
Function: *noun*
Date: 1870

: a place where classes meet

The common school[2]

Miss Blanche Lamont with her school at Hecla, Montana, 1893
Collection of Arthur and Sybil Kern. Library of Congress.
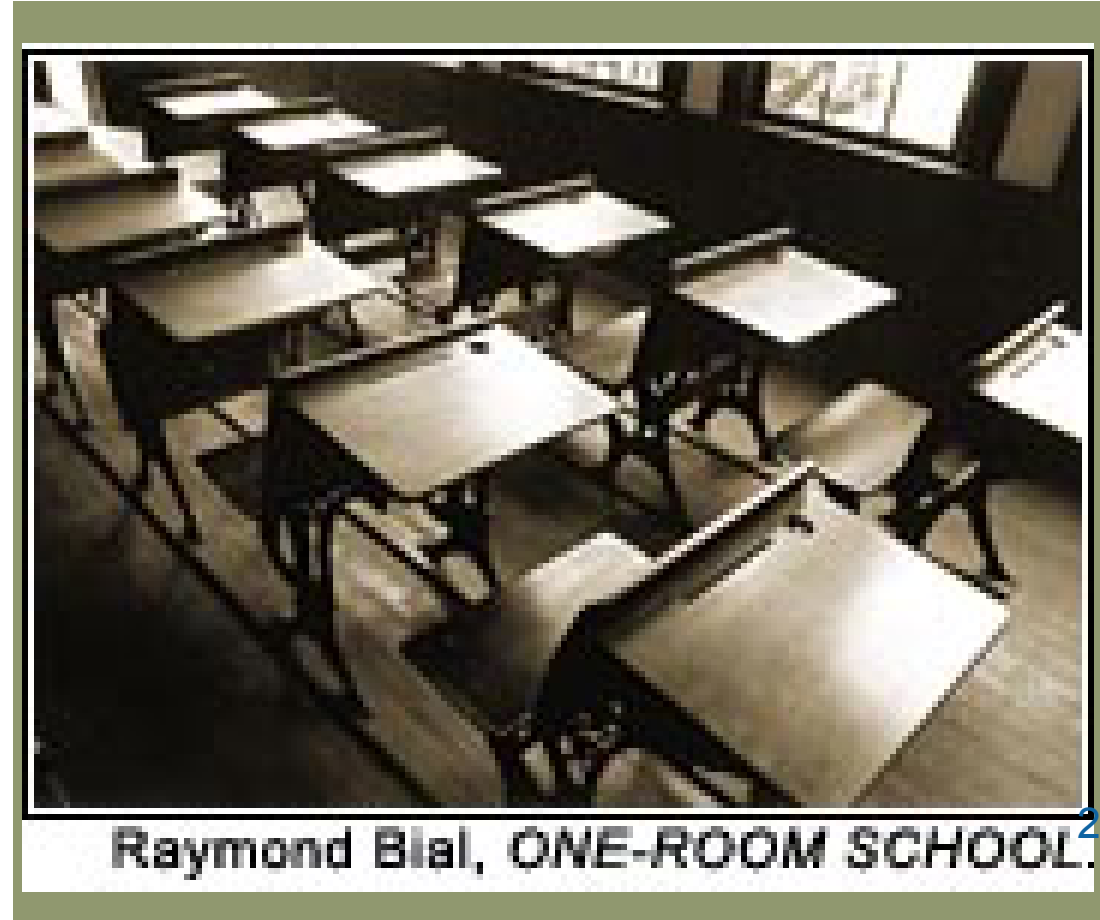
Main Entry: **learn·ing**
Function: *noun*
Date: before 12th century
1 : the **act or experience of one that learns**
2 : knowledge or skill acquired by instruction or study
3 : modification of a **behavioral tendency by experience** (as exposure to conditioning)

Raymond Bial, ONE-ROOM SCHOOL.[2]

Footnotes:

[1]Merriam – Webster On-line dictionary
[2]In early American schools, children sat on three-legged stools or long benches behind narrow tables, often hand-made of pine or oak by the parents of the schoolchildren. By the 1880s, children sat at individual desks that were bolted to the floor, with boys on one side of the room and girls on the other
– picture courtesy of PBS, Schools: The Story of American Public Education

Main Entry: **en·vi·ron·ment**
Pronunciation: in-'vI-r&(n)-m&nt, -'vI(-&)r(n)-
Function: *noun*
Date: 1827
1 : the circumstances, objects, or conditions by which one is **<u>surrounded</u>**

2 a : the complex of physical, chemical, and biotic factors (as climate, soil, and living things) that act upon an organism or an ecological community and ultimately **<u>determine its form and survival</u>**

3 : the position or characteristic position of a linguistic element in a sequence
synonym see BACKGROUND

Footnotes:
[1]Merriam – Webster On-line dictionary

Perry Community Education Village

Proposed Entry: **learn·ing en·vi·ron·ment**

Function: *title replacing the word 'classroom' as a name for a place of learning*
Date: late 20th century

1 : the **circumstances,** objects, and/or conditions **surrounding the act** or experience **of ones' learning**

2 a : the complex of physical, chemical, and biotic factors (as climate, soil, and living things) that act upon an organism and ultimately supports its knowledge or skill acquired by instruction or study

3 : the physical characteristics of **space** supporting modification of a **behavioral tendency by experience**

Footnotes:
[1] the definition for Learning Environment was derived by morphing the definitions of "learning" and "environment"

Components of a Healthy Learning "Environment"

Defining parameters

- A **learning environment** is not bound by walls

- A learning environment consists of **living, interactive relationships** working together to fortuitously bring about a desired result: learning

- Each element has the **ability to contribute** to a healthy learning environment

- Working together with a common goal, the result is outstanding, true learning for all: student, teacher, family and community

Student

Teacher/Curriculum

Family

Community

Architecture/Physical Environment

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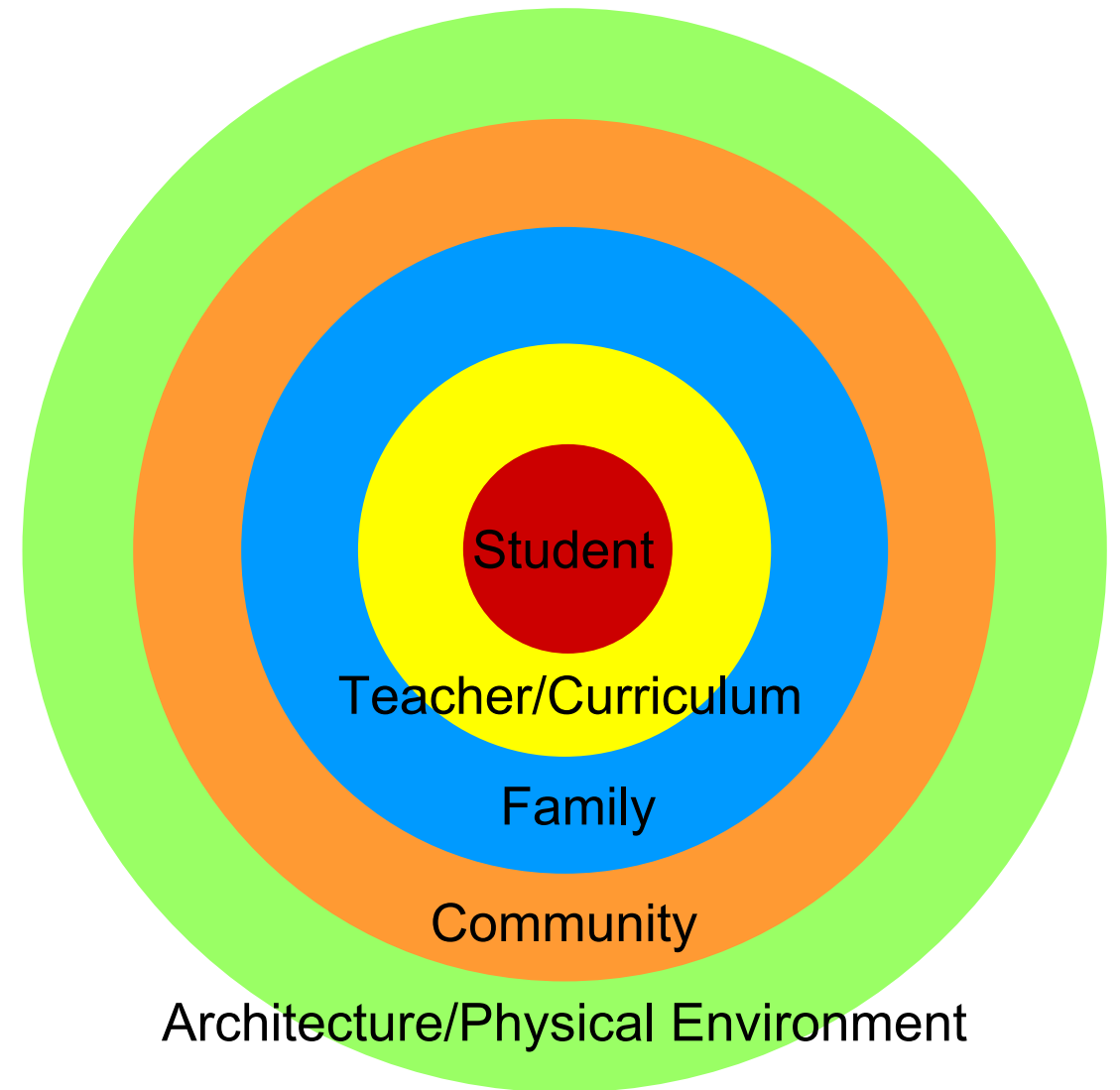
Components of a Learning "Environment"

Implementation

- **Architecture is often considered the least vital element**, but it is also the one that requires the largest up-front capital investment

- How can we **use what we know to make the physical environment work** for you rather than against you?

- Armed with this knowledge, we can all be in a better position to make **intelligent decisions and targeted investments** in facilities to further the goals of our schools

- And it doesn't have to cost more

Student

Teacher/Curriculum

Family

Community

Architecture/Physical Environment

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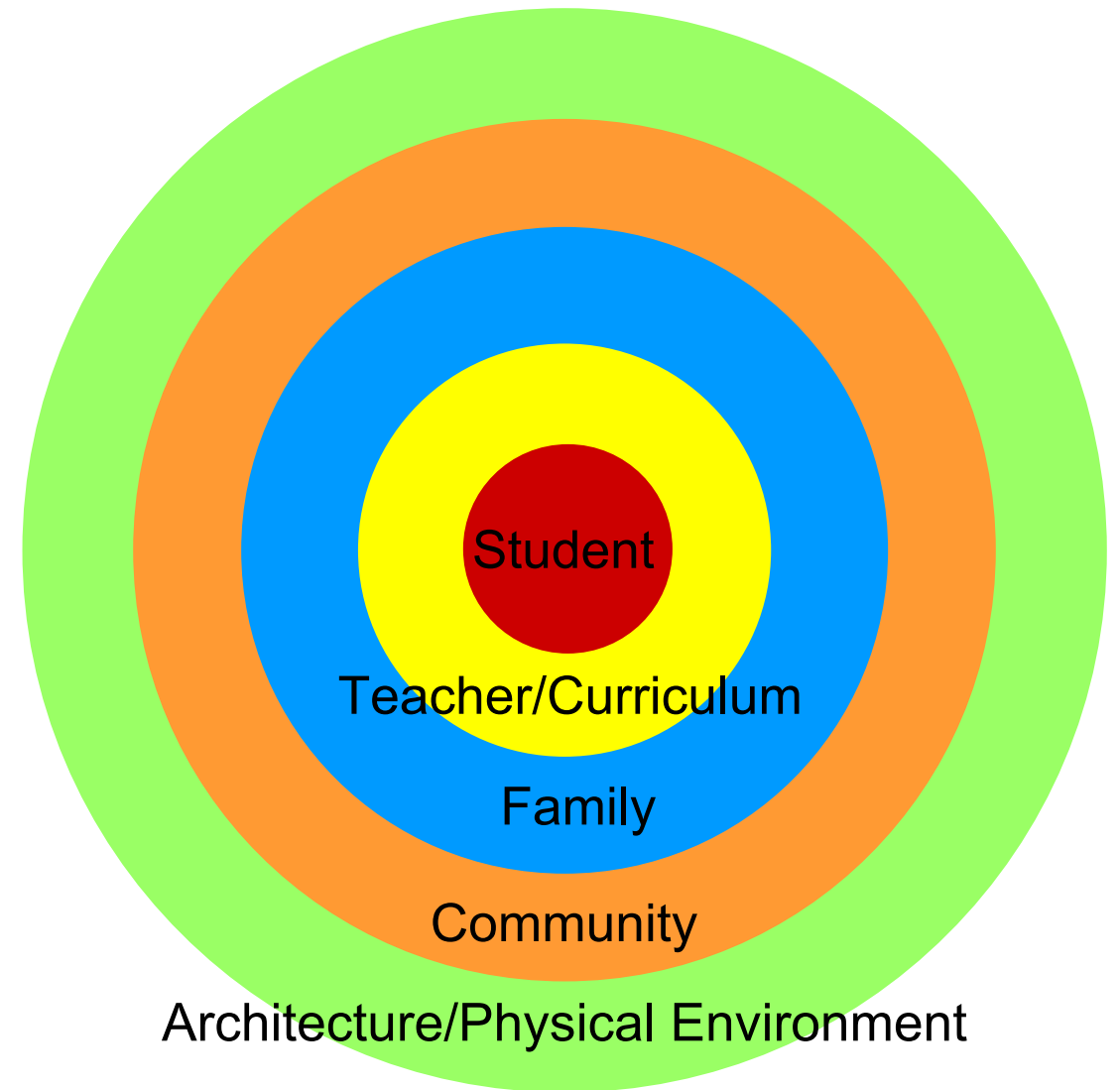
Environmental Issues

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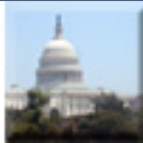
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Calculating the ecological footprint

summary:

Accepting 12 percent as the magic number for biodiversity preservation.

the amount of biologically productive area that exists on our planet, is approximately **4.3 acres per capita are available for human use.**

Calculating the ecological footprint

ecological footprint per person in 1991 (acres per person)

- Bangladesh   1.2
- world average   6.9
- United States   24.0

currently, world wide we are running a 30% overshoot

based on the book, "the ecological footprint, reducing human impact on the earth" by mathis wackernagel & william rees,

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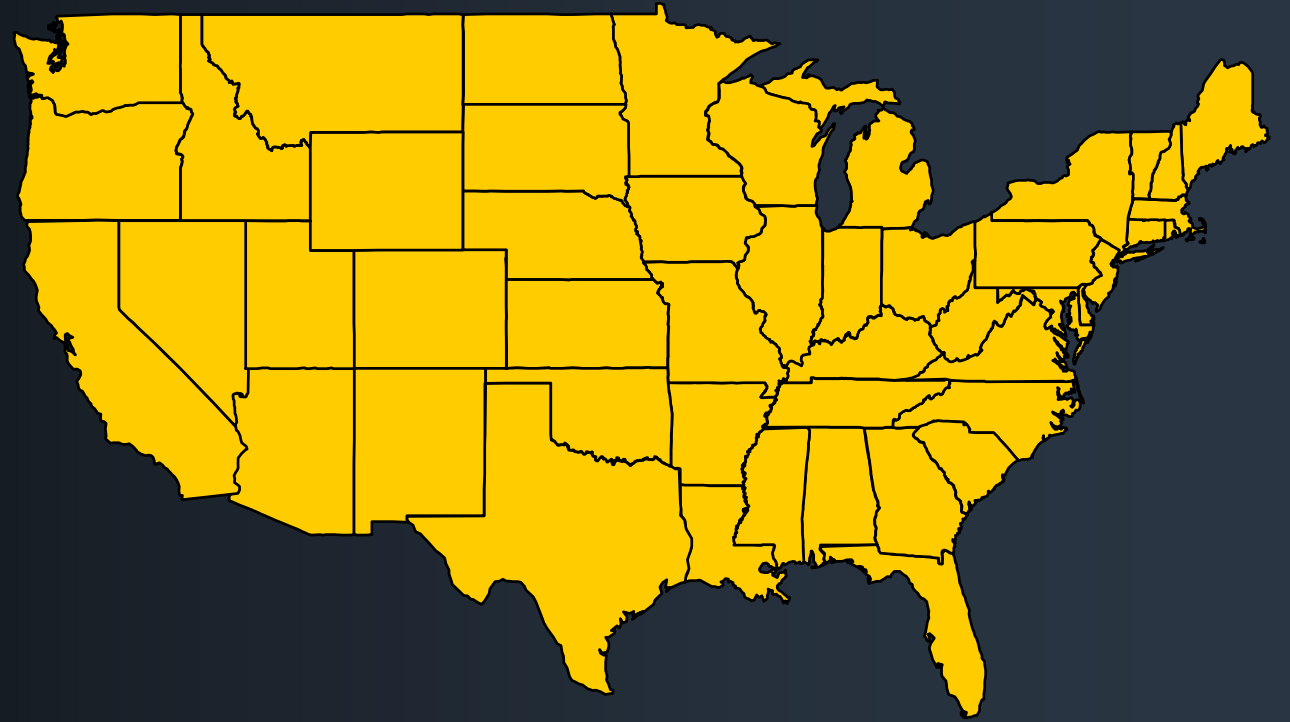October 26-28, 2003

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Calculating the ecological footprint

Public Schools:

47,159,681 students
2,906,554 teachers
133,011 principals/assistant principals
55,245 administrators
53,661 librarians
95,697 guidance counselors
1,713,173 support staff

52,117,022 total

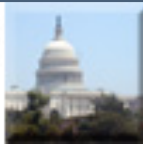at any give time this represents approximately 19% of the US population

Poor indoor Air Quality

- Increase the potential for long-term and short-term health problems, e.g., asthma (the number one cause of student absenteeism);

- Increase absenteeism of students and staff:

- Reduce productivity for teachers and staff;

- Accelerate deterioration and reduce efficiency of heating/cooling equipment;

- Strain relationships among school administration and parent and staff; and
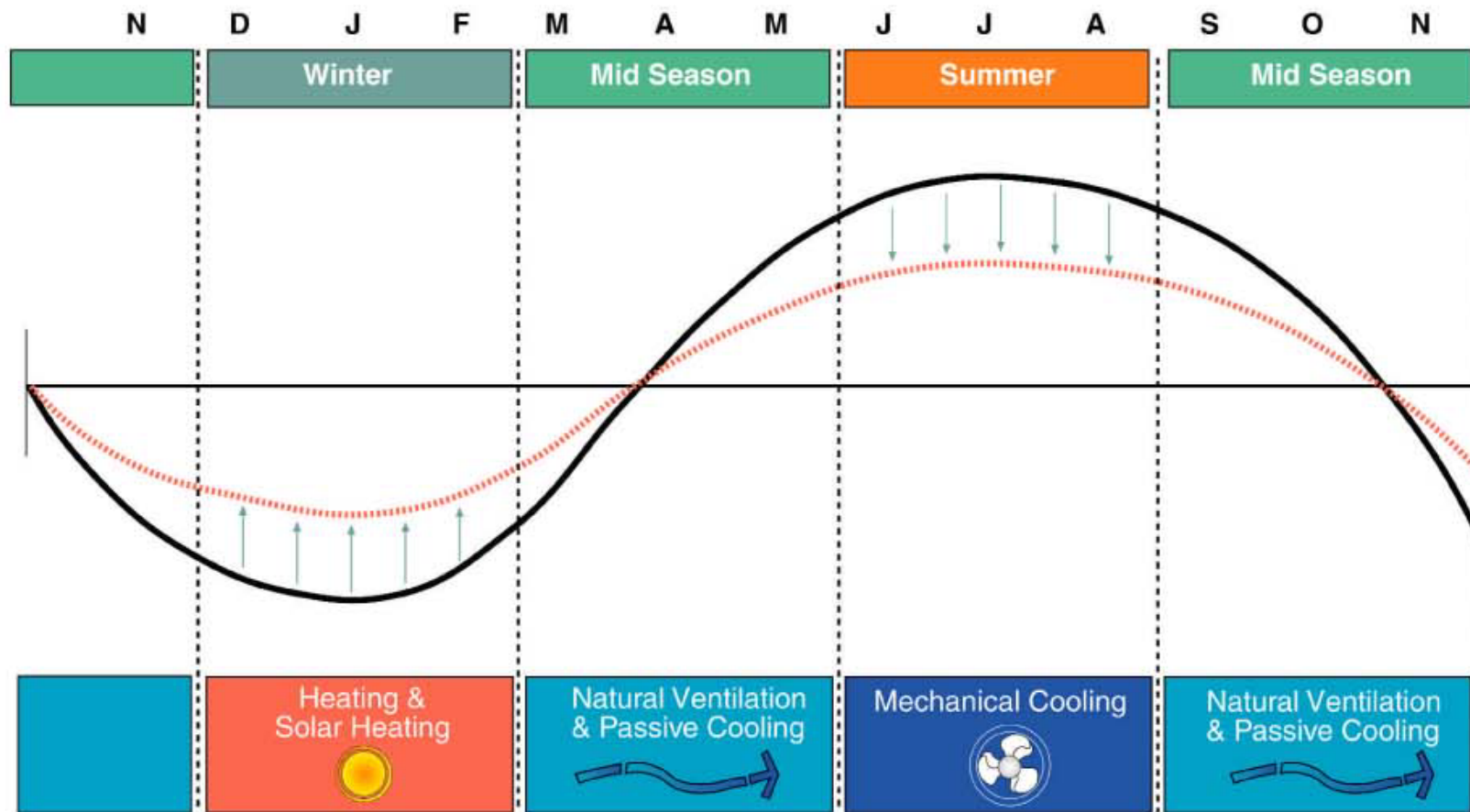
- Create potential liability problems.

"In February 1995 the US Government Accounting Office released a report based on a survey which indicates that over half of our schools have problems which affect indoor air quality."

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Asthma

- 6.3 million children affected
- 1 in 13 school age children are afflicted
- Rate is increasing the fastest among school age children
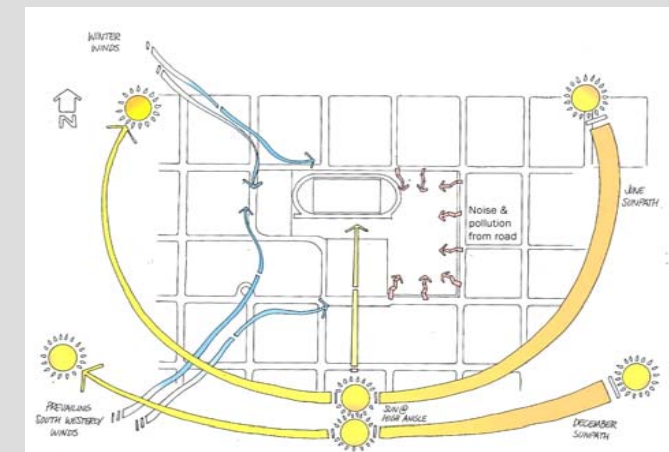- In 2000 14-million school days missed due to Asthma

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Sustainability

N D J F M A M J J A S O N

| | Winter | Mid Season | Summer | Mid Season |

| | Heating & Solar Heating | Natural Ventilation & Passive Cooling | Mechanical Cooling | Natural Ventilation & Passive Cooling |

• goal: to reduce overall energy consumption and improve indoor air quality.

6 Ideas for a 21st century school:

- Reduction in energy costs
- Day lighting where possible
- Indoor air quality (IAQ)
- Maximizing landscape and site design
- Conserve natural resources
- Facilities as teaching tools

Enclosing the Learning Environment

A short history - sustainability

FLOOR PLAN
SCALE IN FEET

KEY TO INDICATION OF WALLS
- ORIGINAL BUILDING
- FIRST ADDITION
- SECOND ADDITION
- FUTURE ADDITIONS
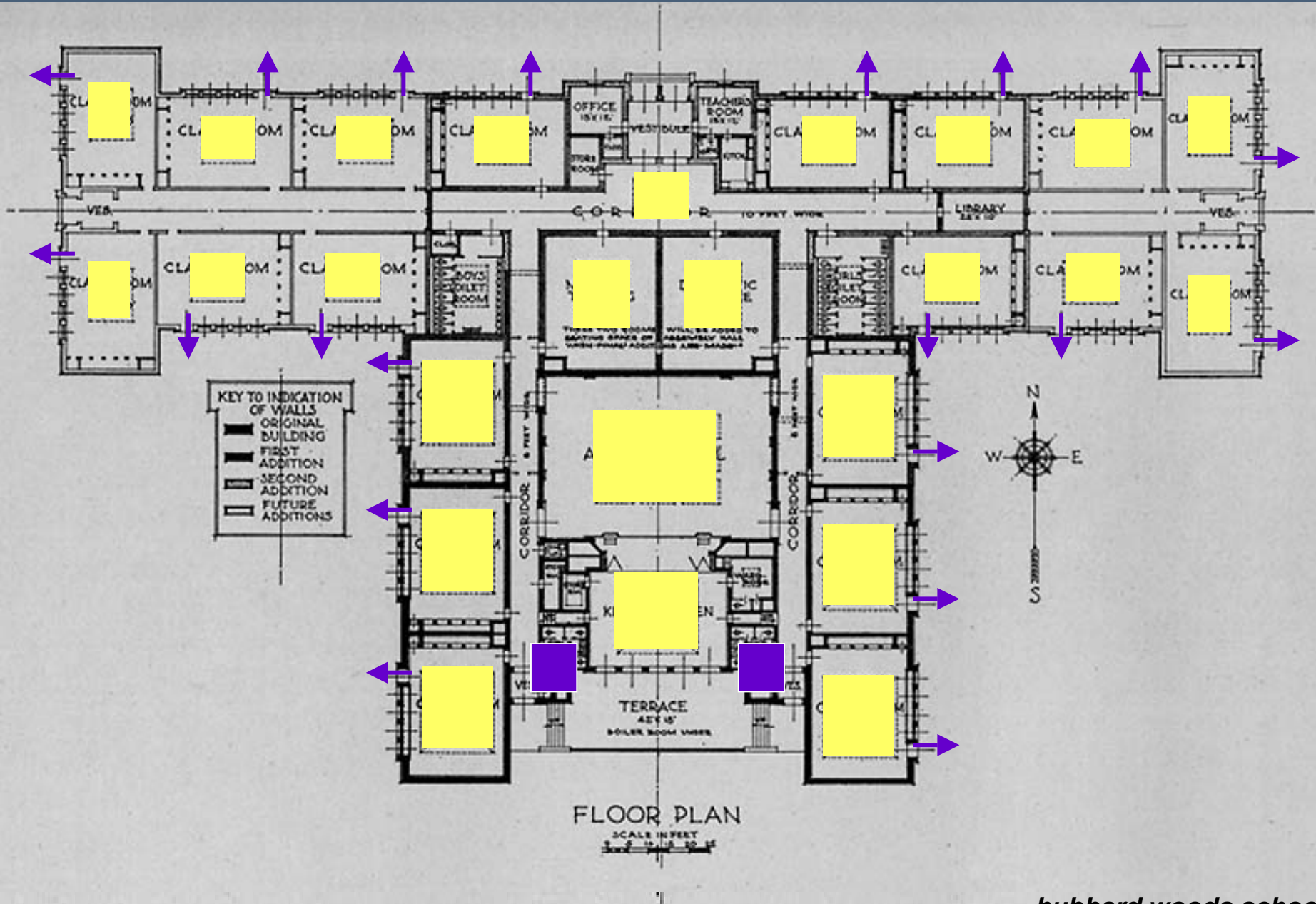
- ◉ skylights in classrooms

- ◉ exterior classroom doors

- ◉ large sheltering roof

- ◉ natural ventilation towers

hubbard woods school
winnetka, il, 1915

hubbard woods school
winnetka, il, 1915

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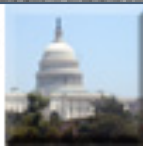*Tools for Schools*

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*Blythe Park
Riverside, IL 1949*
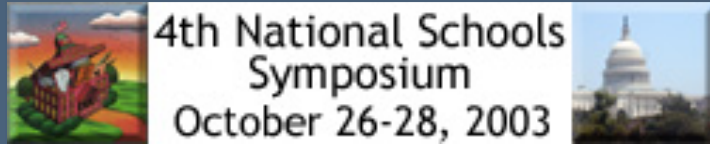
Heathcote School
Scarsdale, N.Y. 1953

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Schools – are they changing to meet needs?

library/media center

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Schools – are they changing to meet needs?
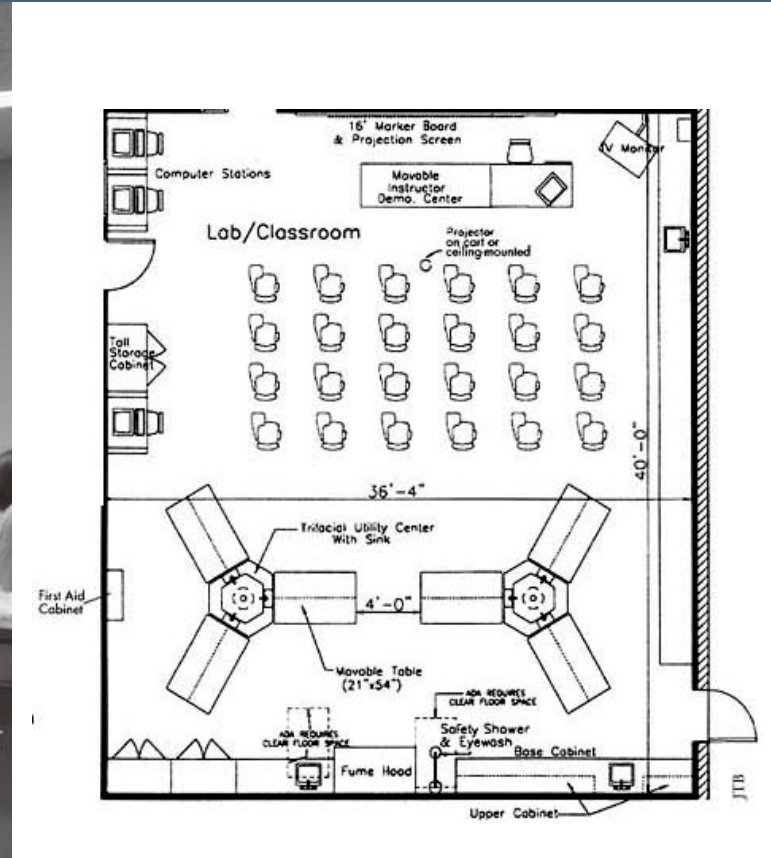

science labs

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Looking to the Future

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Thinking about a perspective of change

The people who are starting college this fall across the nation were born in 1984 or 1985.

- They were 8 when the Soviet Union broke apart and do not remember the Cold War.

- They're too young to remember the space shuttle Challenger disaster. (Jan '86)

- Tianamen Square means nothing to most of them.

- Bottle caps have always been screw off and plastic.

- The statement "You sound like a broken record" means nothing to them because they never owned a record player.

- They may have never heard of an 8 track. The Compact Disc was already introduced when they were born.

The people who are starting college this fall across the nation were born in 1984 or 1985.

- Most have never seen a TV set with only 13 channels, and can't imagine having to get up to turn the channel?

- They've never seen a green or amber screen monitor on a computer.

- There have always been VCRs, but they have no idea what BETA was.

- They don't know what a cloth baby diaper is, or know about the "Help me, I've fallen and I can't get up" commercial.

Feeling old Yet? There's more:

Thinking about a perspective of change

The people who are starting college this fall across the nation were born in 1984 or 1985.

- They were born AFTER the year that Walkmen were introduced by Sony.

- Roller skating has always meant inline for them.

- Jay Leno has always been on the Tonight Show.

- Popcorn has always been cooked in the microwave.

- They have never seen Larry Bird play.

- The Vietnam War is as ancient history to them as WWI, WWII and the Civil War.

- They may have no idea why Americans were ever held hostage in Iran.

- Kansas, Chicago, Boston, America, and Alabama are places, not rock bands

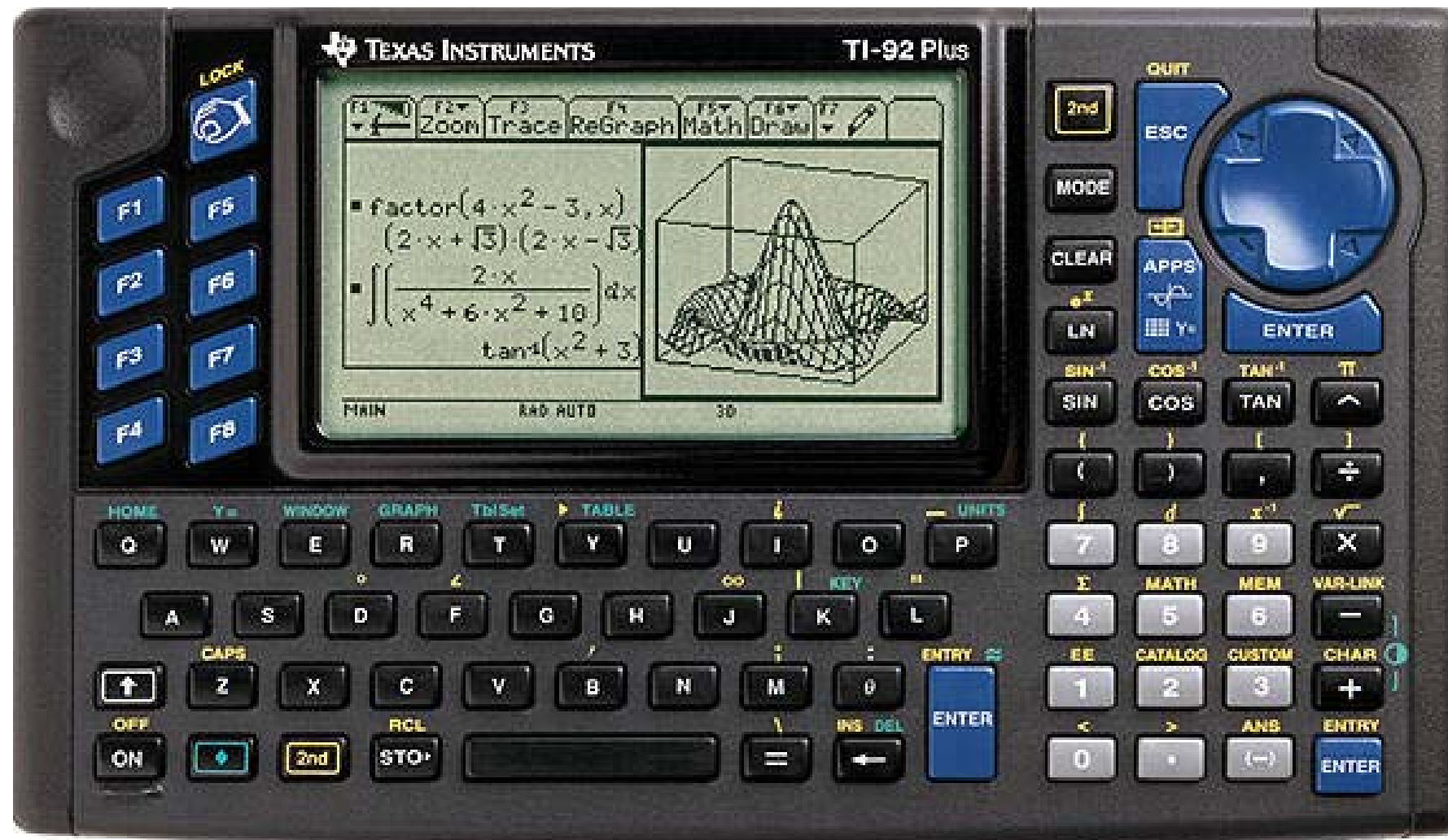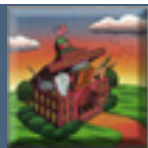4th National Schools Symposium
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"Technology doesn't make you less stupid; it just makes you **stupid faster.**"

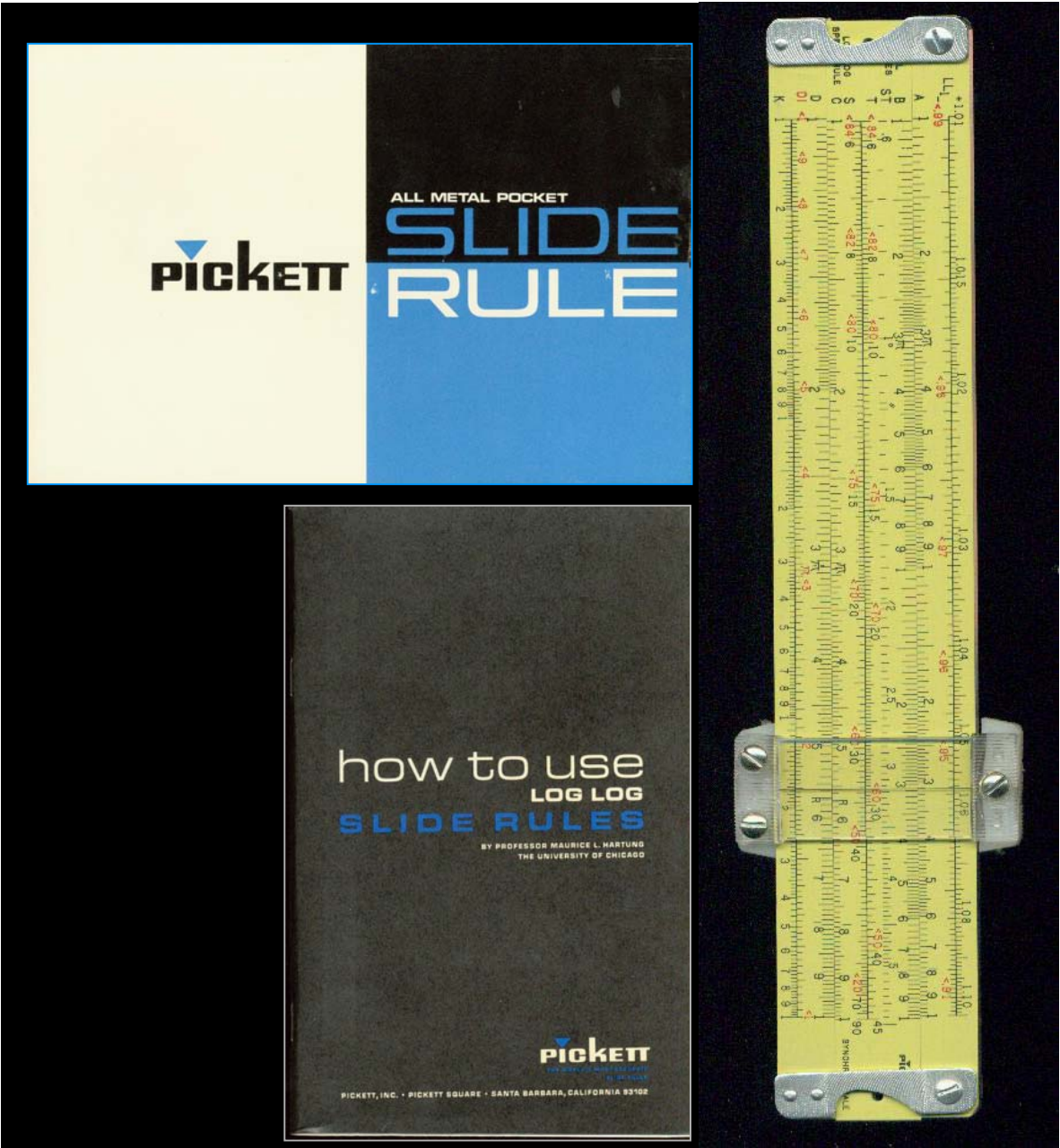Thornton A. May, chief psychographer at Toffler Associates Inc.

Change - technology on our lifetime

1953

2003

The device is a mobile phone, organizer, and MP3 player in one; it is equipped with Microsoft® Office® software and supports the GPRS standard*.

The SX56 combines the functionality of a mobile phone and Pocket PC in one product. The 900/1900 MHz GSM (Global System for Mobile communications) SX56 Pocket PC Phone features high-speed wireless data transfer and international mobility while easily synchronizing with users' Windows®-based personal computers.

"It's the things that pushed you the most, that helped you the most. "

Jim Loehr, performance psychologist

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Three conditions for learning:

- Optimal state of mind called "relaxed alertness"

- The orchestrated immersion of the learner in multiple, complex, authentic experience

- The regular, active processing of experience as the basis for making meaning

Caine and Caine 1997

The basis for a new model of school facility

- are customer oriented

- are systems thinkers

- understand work as a process

- are committed to improvement

- make decisions based on fact

- believe in active learners

- illustrate practical knowledge

- can apply quality tools

- are team oriented

tomorrow's schoolhouse, will combine the best of yesterdays proven benefits with today's innovations. This can only be accomplished as the result of a collaborative process

Learning-Centered Education

A focus of all activities on the learning needs of students. The emphasis is on active student learning with students taking responsibility for the management of key learning processes.

Planning challenges – Facility "Idea" Matrix

	teacher led	learner led	informal or unplanned
high collaboration	**collaborative classrooms**	**team/project rooms**	**learning communities**
low collaboration	**traditional classrooms**	**asynchronous[1] learning spaces**	**non-programmed, informal space**

Footnotes:
[1]not in real time, spaces that rely on e-mail are an example

Planning challenges – Facility "Idea" Matrix

|	teacher led	learned led	informal or unplanned
high collaboration	multi-purpose rooms, seminar rooms, break out space	project rooms, conference rooms, team rooms	libraries, lobbies and hallways
low collaboration	classrooms, demonstration labs, lecture halls	media/internet lab, mobile computing	virtually anywhere

libraries
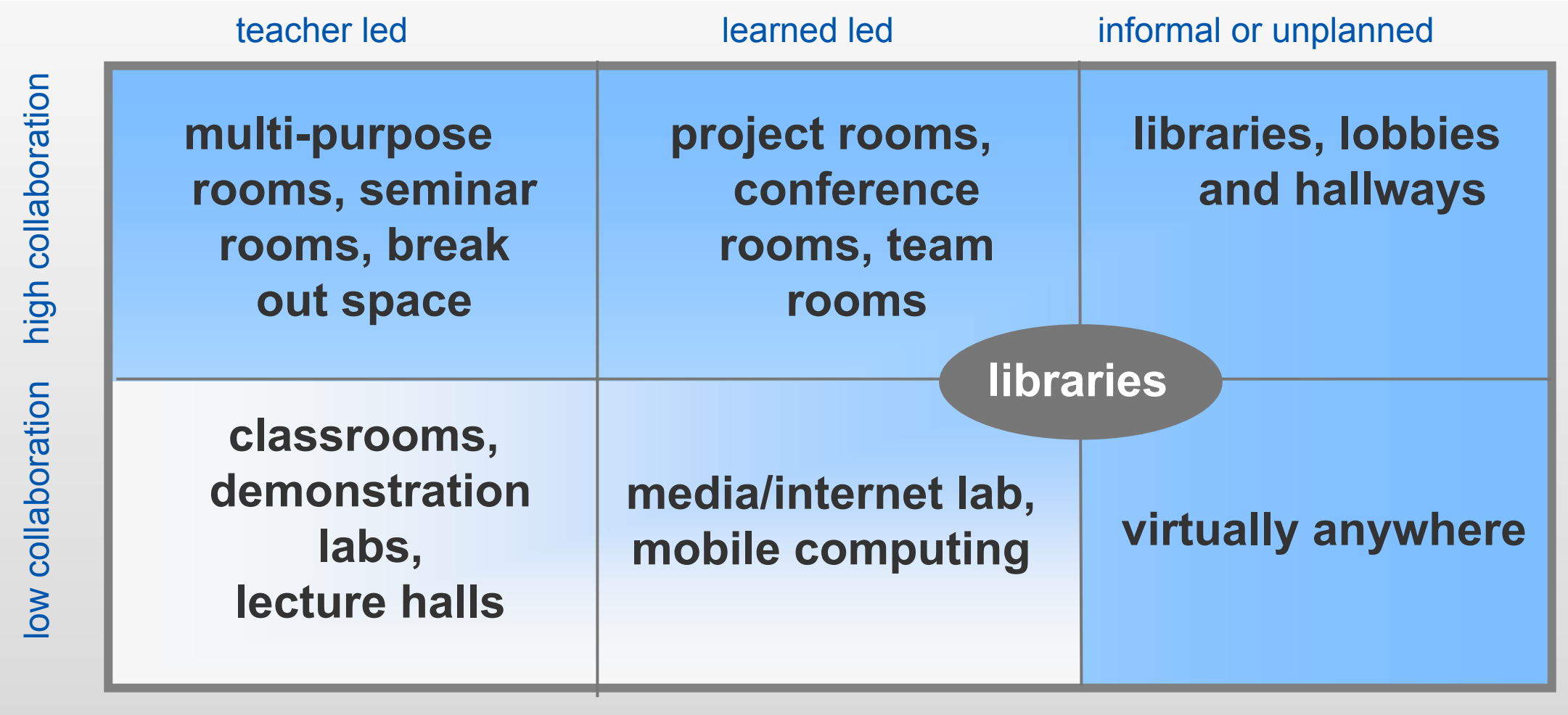
Footnotes:
the role of the library In the 21st century school.
Dr Paul Cornell, Product Development and Marketing, Vecta

Harnessing Change

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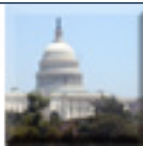
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...many schools built in the past 5 years were 'designed for the 21st century'...

but they were mostly:
- *built with 1950's architecture*
- *using 1990's technology*
- *to deliver a 1960's curriculum.*

if you take out the technology and ask what is different, the answer is often, nothing."

From Learning by Design, "Ergonomically Correct Classrooms" by Kevin Bushweller quoting **Bill Skilling, Principal Byron Center HS**
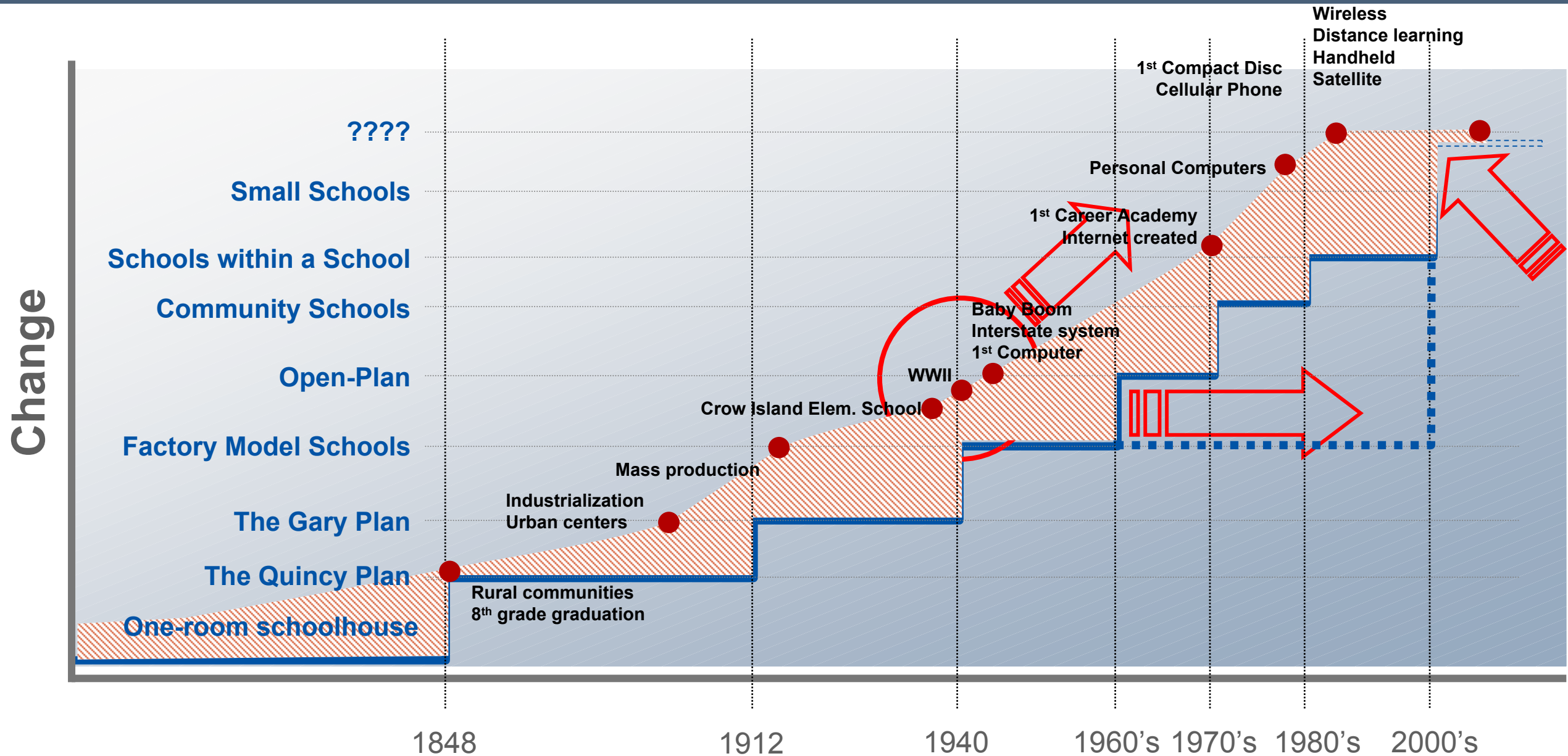
Innovation – a general timeline

Change

????

Small Schools

Schools within a School

Community Schools

Open-Plan

Factory Model Schools

The Gary Plan

The Quincy Plan

One-room schoolhouse

Wireless
Distance learning
Handheld
Satellite

1st Compact Disc
Cellular Phone

Personal Computers

1st Career Academy
Internet created

Baby Boom
Interstate system
1st Computer

WWII

Crow Island Elem. School

Mass production

Industrialization
Urban centers

Rural communities
8th grade graduation

1848   1912   1940   1960's 1970's 1980's 2000's

Source: Bradley, W.S. "The Evolving Role of the American Schoolhouse" Online. Internet.
http://curry.edschool.virginia.edu/class/edlp/800/papers/history/history.html.

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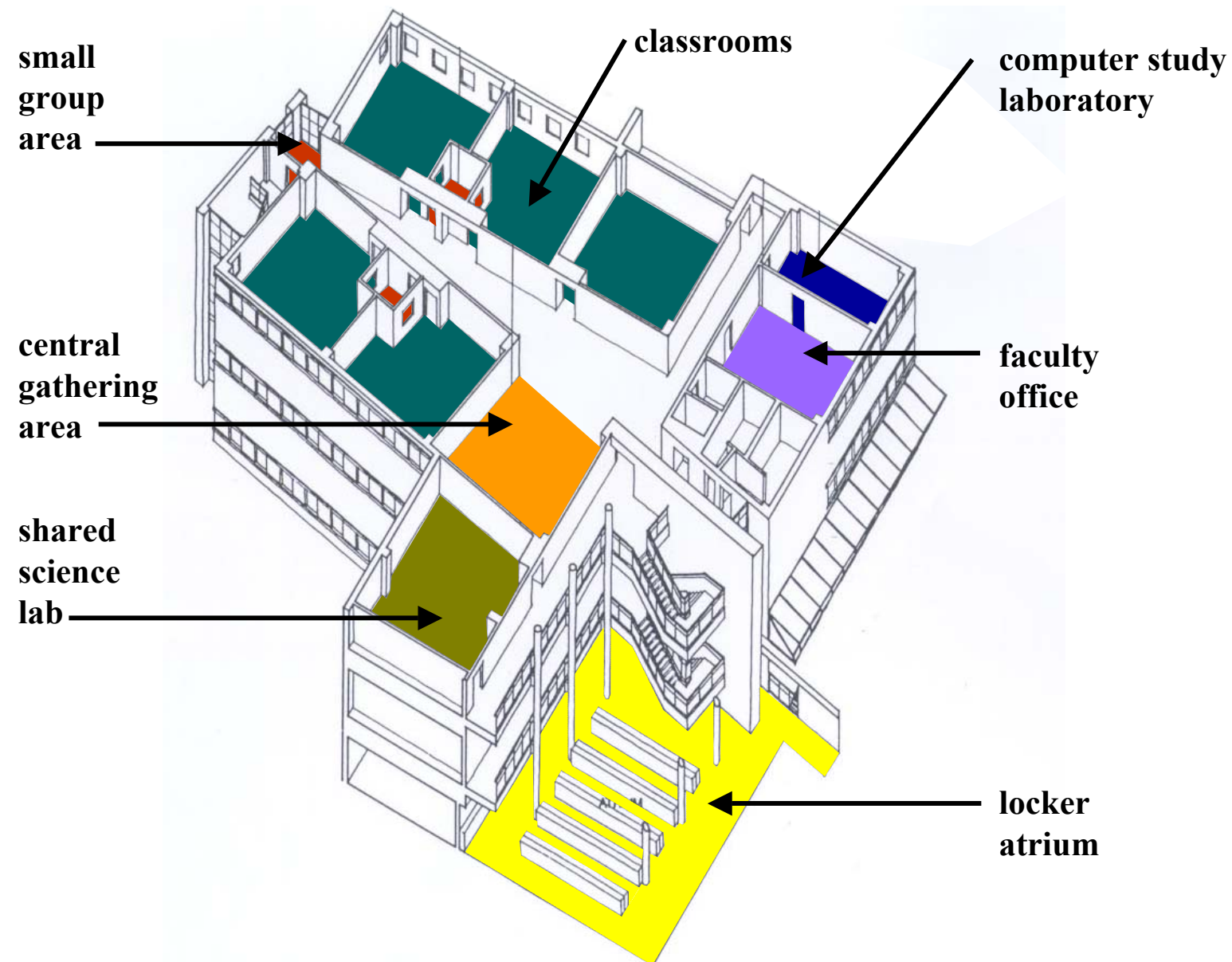
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Planning for the future – tying it all together

innovation

tomorrow's school

yesterday's school:
learner-scaled
day-lighting
informal space

today's school
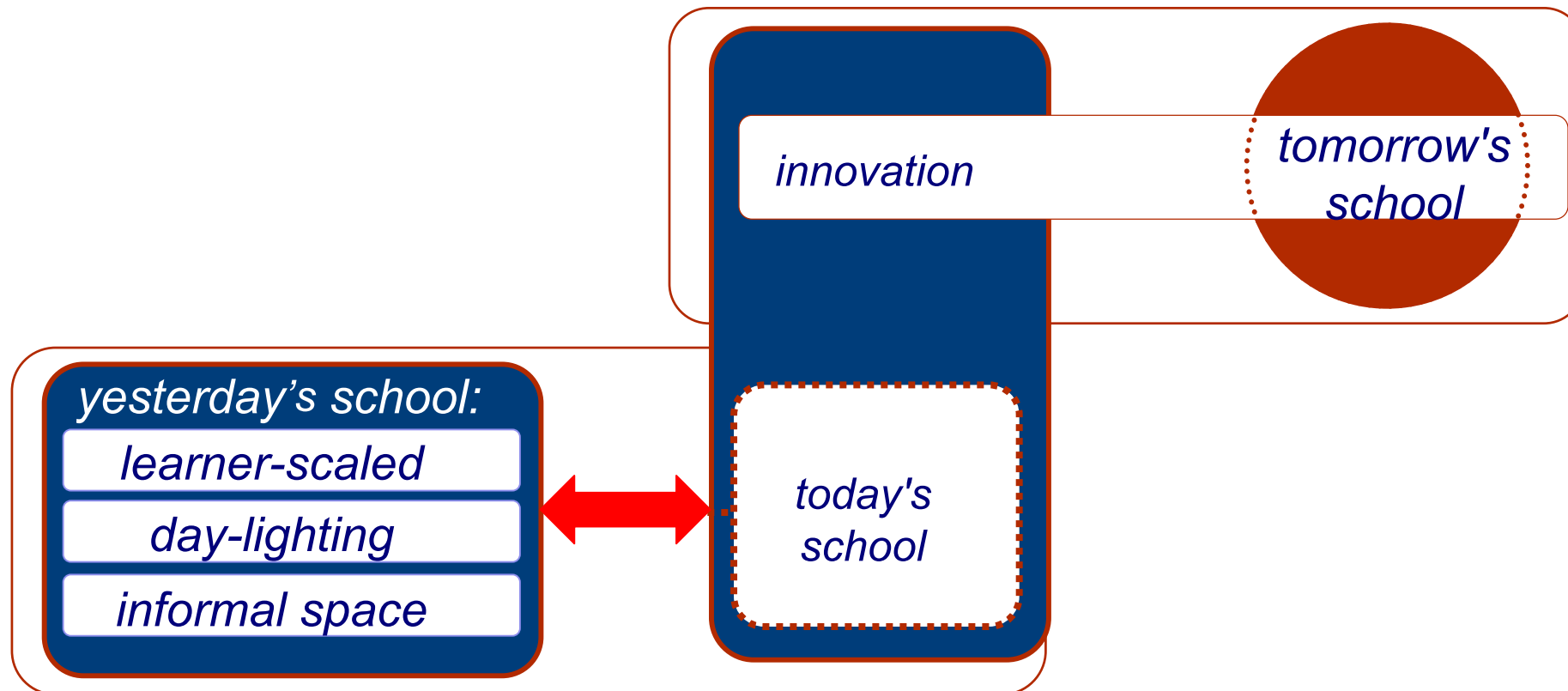
failing to *capitalize on past innovation* is as problematic as failing to *develop new innovation*

Smaller is better

small group area

classrooms

computer study laboratory

central gathering area

faculty office

shared science lab

locker atrium

Arlington High School, St. Paul, Minnesota

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Integrated curriculum

LEVEL 2

LEVEL 1

lab

lab   vo-tech

building section diagram

classrooms

prep

science   vo-tech

academic wing diagram

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Integrated curriculum

TEACHER OFFICE

CN

CIRCULATION PATH

PREP   STORAGE

OCCUPATIONAL
SCIENCES LAB

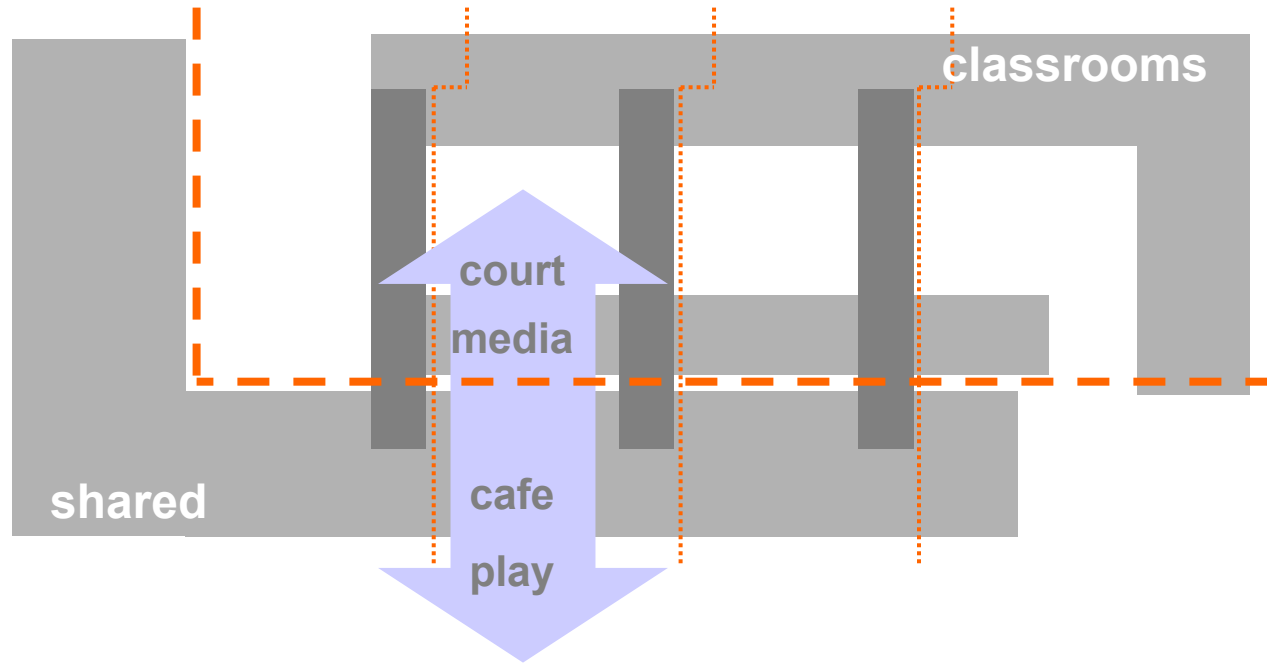SMALL GROUP
ROOMS

CLASSROOMS – 6
TOTAL

STAIR

STAIR

T.S.

SCIENCE

PREP
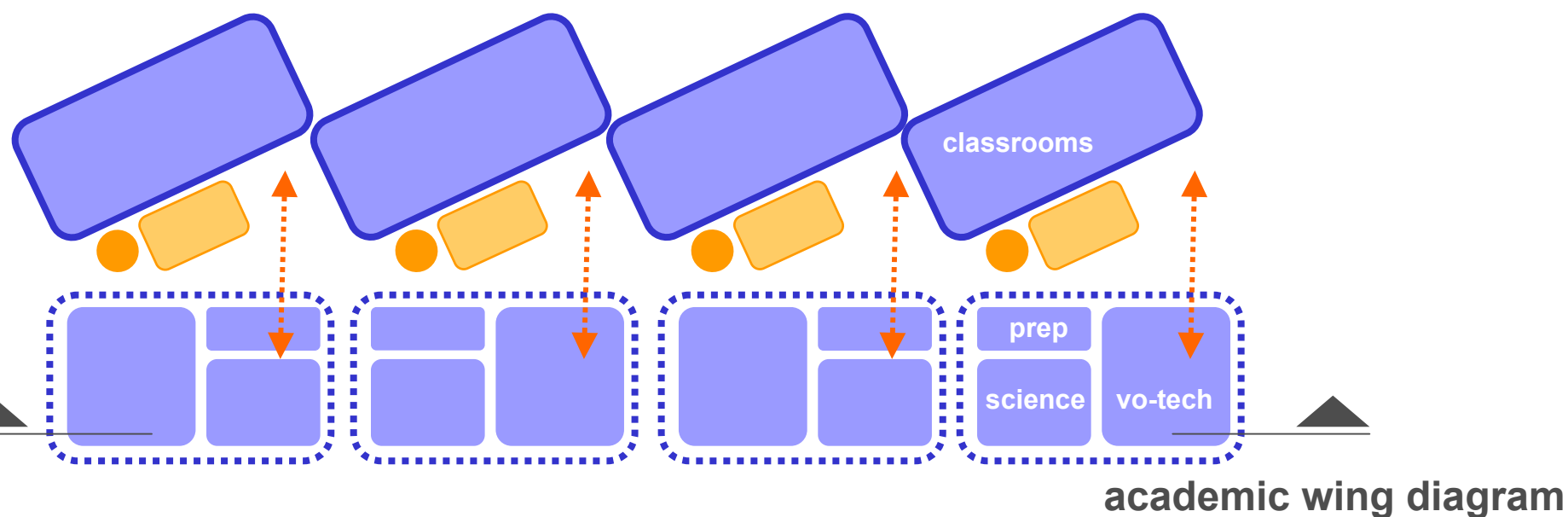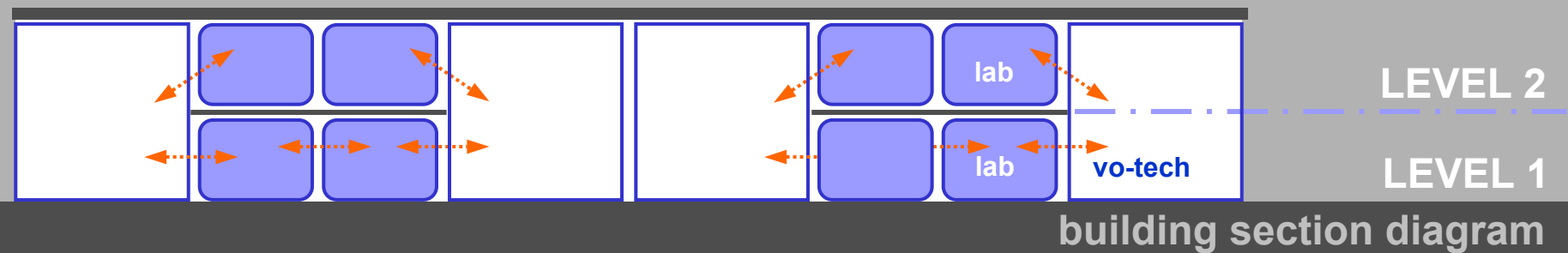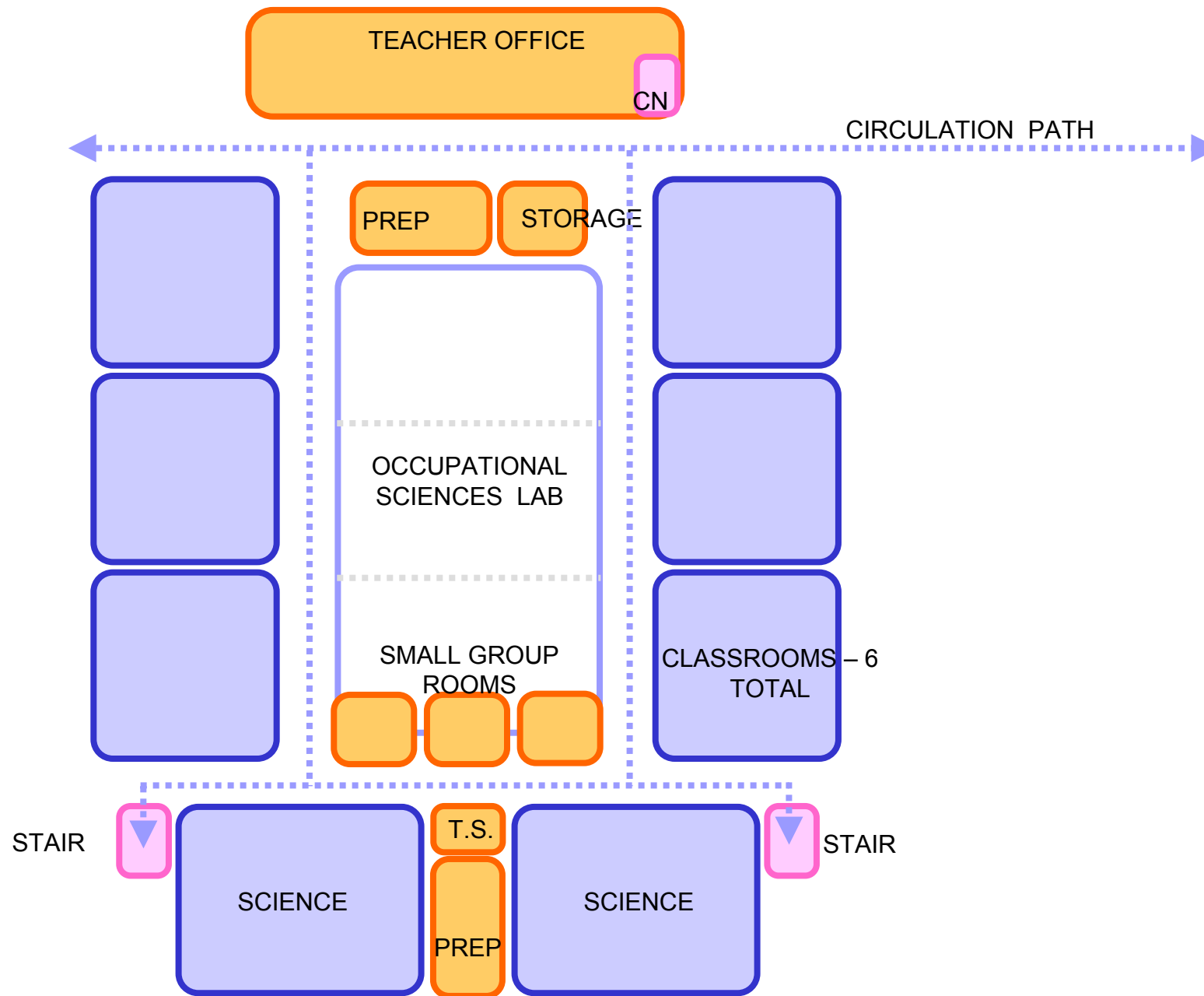
SCIENCE

- Integrates Occupational Sciences with the core curriculum

- reduces movement in the building

- supports hands on – real world experiences

Transparency, connection and security

classrooms

court

media

shared

cafe

play

Erskine Elementary School

- **student-centered** decision making.

- **flexible** and program driven facilities.

- **variety** in teaching practices.

- **technology** integrated with learning.

- **life-long learning** that supports community.

- **flexibility**, **agility** and **multi-function**.

- **formal** and **informal** interaction.

- consistent image or "**brand**".

- real benefits (and value) for the learner.

- **engaging** students with the real-world.

- preparing for **change**.
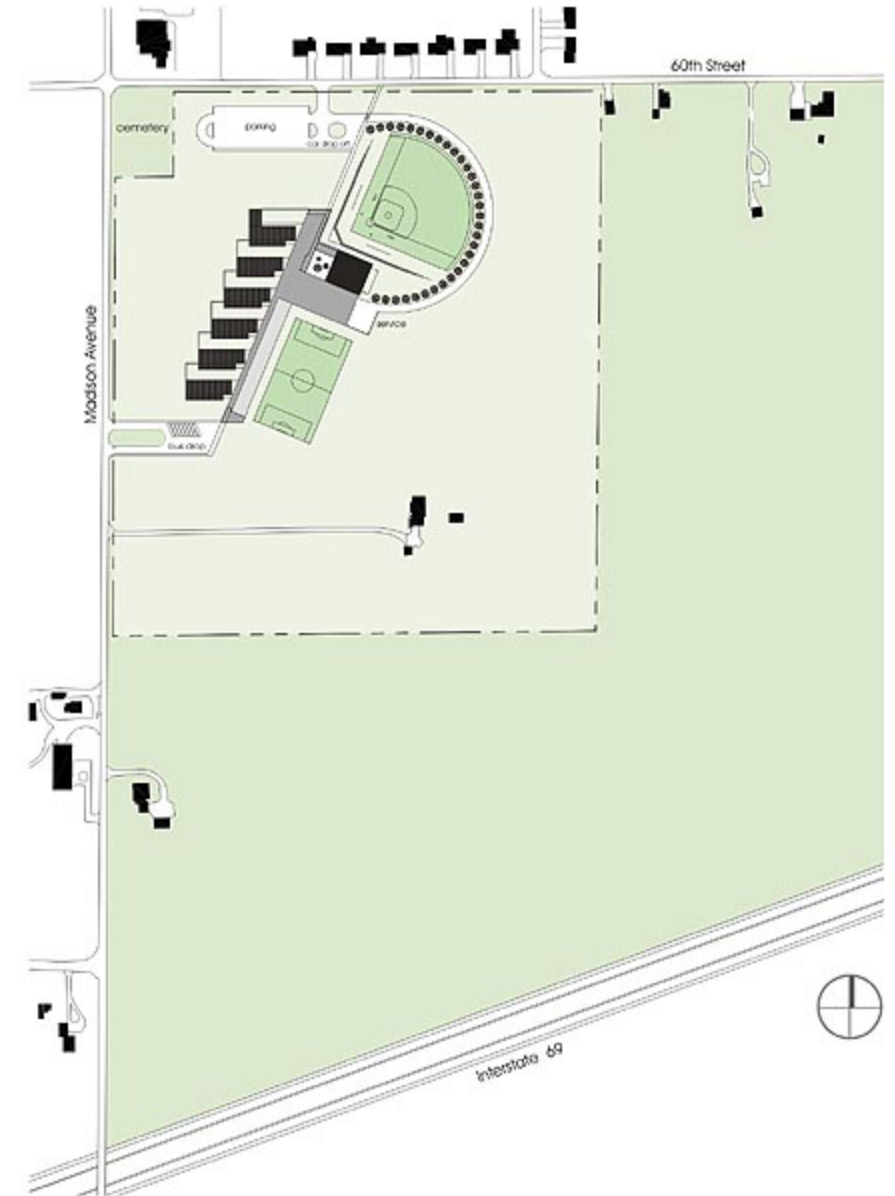
Erskine Elementary School

- Site orientation
- Site zones
- Building zones
- Community support
- Special populations

- Learning variety.
- Distributed resources
- Outdoor learning
- Theme development

what influences or limits innovation?

- Local, regional, global workforce trends

- Willingness to maximize square footage investment

- Community perception of need to innovate

- Districts perception of need to innovate

- Prototypes

why aren't we moving ahead faster?

- Trends - what has been done vs. what will be done.

- Bench marking – leading to the future or holding onto the past?

- Equity – justifying average

- Accepting change

- Funding, limitation or opportunity? (capital improvement and operational)

- There is an integrated planning and design process

- There is a willingness to understand and accept change

- Places importance on the *Healthy Learning Environment*

- Teaches good design, sustainability, structure and scale

- Is Flexible and *Agile* to meet the changing demands of a dynamic society

Where Education meets Architecture

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